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10/042,636	01/09/2002	Takashi Maekawa	0050.2042-001	6074

21005 7590 03/25/2004	EXAMINER
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Please find below and/or attached an Office communication concerning this application or proceeding.

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>11 March 2002</u>.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-71</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) <u>34,37 and 38</u> is/are allowed.

6)☐ Claim(s) <u>1-5,26-33,35,36,39-43 and 64-71</u> is/are rejected.

7)☐ Claim(s) <u>6-25, 44-63</u> is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>4</u>.

4)☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

2.   This application currently names joint inventors. In considering patentability of

the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of

the various claims was commonly owned at the time any inventions covered therein

were made absent any evidence to the contrary. Applicant is advised of the obligation

under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g)

prior art under 35 U.S.C. 103(a).

3.   Claims 1-5, 26-33, 35-36, 39-43, and 64-71 are rejected under 35 U.S.C. 103(a)

as being unpatentable over OHBUCHI et al. (A Shape-Preserving Data Embedding

Algorithm for NURBS Curves and Surfaces) in view of MAEKAWA et al. (Umbilics and

Lines of Curvature for Shape Interrogation).

As per claim 1, Ohbuchi teaches the claimed "method for determining whether a suspect 3-D surface has been copied from an original 3-D surface" (Ohbuchi, page 180, column 1, first Introduction paragraph; page 181, column 2, lines 12-26), comprising "determining whether the suspect surface is a copy of the original surface responsive to a step of comparing" (Ohbuchi, page 185, column 1, lines 6-22, the characteristic of embedded data is preserved). It is noted that Ohbuchi does not teach the watermark data is embedded in the umbilics of the two surfaces. Maekawa teaches that the umbilics can be used as watermark in surface recognition (Maekawa, Abstract, page 133). Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made, in view of the teaching of Maekawa, to configure Ohbuchi's method as claimed because the use of umbilics as watermark in the surface recognition enhances the detection of the generic features of the freeform parametric surfaces for shape interrogation.

Claim 2 adds into claim 1 "determining whether locations of the umbilics of the suspect surface match within a specified margin umbilics of the original surface" which Ohbuchi does not teach. However, Maekawa teaches such step "determining whether locations of the umbilics of the suspect surface match within a specified margin umbilics of the original surface" in tables 1 and 2 (page 157). Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made, in view of the teaching of Maekawa, to configure Ohbuchi's method as claimed because the locations of the umbilics is used as a criteria to enhance the detection of the copy of the original surface.

Claim 3 adds into claim 2 "determining whether pattern types of umbilics of the suspect surface match pattern types of corresponding umbilics of the original surface" which Ohbuchi does not teach. However, Maekawa teaches this feature in page 157, lines 1-3. Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made, in view of the teaching of Maekawa, to configure Ohbuchi's method as claimed because the pattern of the umbilics is used as a criteria to enhance the detection of the copy of the original surface.

Claim 4 adds into claim 1 "manipulating at least one of the surfaces so that characteristics of the two surfaces approximately match" which Ohbuchi does not teach. However, Maekawa teaches this feature in page 155, the perturbation, and equation 92. Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made, in view of the teaching of Maekawa, to configure Ohbuchi's method as claimed because the adjusting of one of the surfaces helps to enhance the comparison for detecting the copy of the original surface.

Claim 5 adds into claim 4 "the step of manipulating comprises at least one of translating, rotating and scaling" which Ohbuchi does not teach. However, Maekawa teaches this feature in equation 92 as a translation operation. Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made, in view of the teaching of Maekawa, to configure Ohbuchi's method as claimed because such manipulations as translating, rotating and scaling one of the surfaces helps to enhance the comparison for detecting the copy of the original surface.

Claim 26 adds into claim 1 "the surfaces are closed" which Ohbuchi does not teach. However, Maekawa teaches this feature in page 154, the Bezier patch. Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made, in view of the teaching of Maekawa, to configure Ohbuchi's method as claimed because the closed surface is used as a criteria to enhance the detection of the copy of the original surface.

Claim 27 adds into claim 1 "the surfaces are bordered" which Ohbuchi does not teach. However, Maekawa teaches this feature in figure 9, page 155. Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made, in view of the teaching of Maekawa, to configure Ohbuchi's method as claimed because the bordered surface is used as a criteria to enhance the detection of the copy of the original surface.

Claim 28 adds into claim 1 "at least one of the surfaces is represented using parametric modeling" which Ohbuchi does not teach. However, Maekawa teaches this feature in the parametric surface in Monge form (page 159). Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made, in view of the teaching of Maekawa, to configure Ohbuchi's method as claimed because the parametric surface is used to represent the objects as a criteria to enhance the detection of the copy of the original surface.

Claim 29 adds into claim 28 "parametric modeling is based on non-uniform rational Bsplines (NURBS)" which Ohbuchi teaches in page 182, figure 1.

Claim 30 adds into claim 1 "at least one of the surfaces is represented using Polygons" which Ohbuchi teaches in figures 5-6, page 185.

Claim 31 adds into claim1 "at least on of the surfaces is represented using intrinsic modeling" which Ohbuchi teaches in page 186, column 1, lines 6-12.

Claim 32 adds into claim 1 "maintaining a registry of 3-D shapes to be used in comparisons with the suspect surface" which Ohbuchi does not teach. However, Maekawa teaches this feature in pages 156-157, figures 10-11, tables 1-2. Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made, in view of the teaching of Maekawa, to configure Ohbuchi's method as claimed because the storing of the 3-D shapes used for a subsequent comparison helps to improve the speed of process and enhances the detection of the copy of the original surface.

Claim 33 adds into claim 32 "indexing the maintained shapes according to umbilic locations and their associated pattern types" which Ohbuchi does not teach. However, Maekawa teaches this feature in page 157, tables 1-2. Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made, in view of the teaching of Maekawa, to configure Ohbuchi's method as claimed because the indexing of the 3-D shapes used for a subsequent comparison helps to improve the speed of process and enhances the detection of the copy of the original surface.

As per claim 35, Ohbuchi teaches the claimed "method for determining whether a suspect 3-D surface has been copied from a 3□D surface model" (Ohbuchi, page 180, column 1, first Introduction paragraph; page 181, column 2, lines 12-26), comprising

"maintaining a registry of 3-D shapes to be used in comparisons with a suspect surface" (Ohbuchi, page 185, column 1, lines 6-22, the characteristic of embedded data is preserved). It is noted that Ohbuchi does not teach the watermark data is embedded in the umbilics of the two surfaces. Maekawa teaches that the umbilics can be used as watermark in surface recognition (Maekawa, Abstract, page 133) and comparing locations and associated pattern types of umbilics of the suspect surface with the shapes maintained in the registry (Maekawa, page 157, tables 1-2. Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made, in view of the teaching of Maekawa, to configure Ohbuchi's method as claimed because the use of umbilics as watermark in the surface recognition enhances the detection of the generic features of the freeform parametric surfaces for shape interrogation.

Claim 36 adds into claim 35 "the maintained shapes are indexed according to umbilic locations and their associated pattern types" which Ohbuchi does not teach. However, Maekawa teaches this feature in pages 157-158, tables 1-4. Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made, in view of the teaching of Maekawa, to configure Ohbuchi's method as claimed because the indexing of the 3-D shapes according to its shapes and patterns used for a subsequent comparison helps to improve the speed of process and enhances the detection of the copy of the original surface.

As per claim 39, Ohbuchi teaches the claimed "system for determining whether a suspect 3-D surface has been copied from an original 3-D surface" (Ohbuchi, the computer system which performs the detection; page 180, column 1, first Introduction

paragraph; page 181, column 2, lines 12-26), comprising "an analyzer which determines whether the suspect surface is a copy of the original surface responsive to a step of comparing" (Ohbuchi, page 185, column 1, lines 6-22, the CAD system which is implemented to have the characteristic of embedded data preserved). It is noted that Ohbuchi does not teach "a comparator which compares locations and associated pattern types of umbilics of the two surfaces". Maekawa teaches that the locations and pattern types of the umbilics can be used as watermark in surface recognition (Maekawa, Abstract, page 157, tables 1-2, lines 1-3). Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made, in view of the teaching of Maekawa, to configure Ohbuchi's method as claimed because the use of locations and pattern types of the umbilics as watermark in the surface recognition enhances the detection of the generic features of the freeform parametric surfaces for shape interrogation.

Claim 40 adds into claim 39 "the comparator determining whether locations of the umbilics of the suspect surface match within a specified margin umbilics of the original surface" which Ohbuchi does not teach. However, Maekawa teaches such step "determining whether locations of the umbilics of the suspect surface match within a specified margin umbilics of the original surface" in tables 1 and 2 (page 157). Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made, in view of the teaching of Maekawa, to configure Ohbuchi's method as claimed because the locations of the umbilics is used as a criteria to enhance the detection of the copy of the original surface.

Claim 41 adds into claim 40 "the comparator further determining whether pattern types of umbilics of the suspect surface match pattern types of corresponding umbilics of the original surface" which Ohbuchi does not teach. However, Maekawa teaches this feature in page 157, lines 1-3. Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made, in view of the teaching of Maekawa, to configure Ohbuchi's method as claimed because the pattern of the umbilics is used as a criteria to enhance the detection of the copy of the original surface.

Claim 42 adds into claim 39 "a manipulator manipulating at least one of the surfaces so that characteristics of the two surfaces approximately match" which Ohbuchi does not teach. However, Maekawa teaches this feature in page 155, the perturbation, and equation 92. Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made, in view of the teaching of Maekawa, to configure Ohbuchi's method as claimed because the adjusting of one of the surfaces helps to enhance the comparison for detecting the copy of the original surface.

Claim 43 adds into claim 42 "the manipulator performs at least one of translating, rotating and scaling" which Ohbuchi does not teach. However, Maekawa teaches this feature in equation 92 as a translation operation. Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made, in view of the teaching of Maekawa, to configure Ohbuchi's method as claimed because such manipulations as translating, rotating and scaling one of the surfaces helps to enhance the comparison for detecting the copy of the original surface.

Claim 64 adds into claim 39 "the surfaces are closed" which Ohbuchi does not teach. However, Maekawa teaches this feature in page 154, the Bezier patch. Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made, in view of the teaching of Maekawa, to configure Ohbuchi's method as claimed because the closed surface is used as a criteria to enhance the detection of the copy of the original surface.

Claim 65 adds into claim 39 "the surfaces are bordered" which Ohbuchi does not teach. However, Maekawa teaches this feature in figure 9, page 155. Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made, in view of the teaching of Maekawa, to configure Ohbuchi's method as claimed because the bordered surface is used as a criteria to enhance the detection of the copy of the original surface.

Claim 66 adds into claim 39 "at least one of the surfaces is represented using parametric modeling" which Ohbuchi does not teach. However, Maekawa teaches this feature in the parametric surface in Monge form (page 159). Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made, in view of the teaching of Maekawa, to configure Ohbuchi's method as claimed because the parametric surface is used to represent the objects as a criteria to enhance the detection of the copy of the original surface.

Claim 67 adds into claim 66 "parametric modeling is based on non-uniform rational Bsplines (NURBS)" which Ohbuchi teaches in page 182, figure 1.

Claim 68 adds into claim 39 "at least one of the surfaces is represented using

Polygons" which Ohbuchi teaches in figures 5-6, page 185.

Claim 69 adds into claim 39 "at least on of the surfaces is represented using intrinsic modeling" which Ohbuchi teaches in page 186, column 1, lines 6-12.

Claim 70 adds into claim 39 "a registry of 3-D shapes to be used in comparisons with the suspect surface" which Ohbuchi does not teach. However, Maekawa teaches this feature in pages 156-157, figures 10-11, tables 1-2. Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made, in view of the teaching of Maekawa, to configure Ohbuchi's method as claimed because the storing of the 3-D shapes used for a subsequent comparison helps to improve the speed of process and enhances the detection of the copy of the original surface.

Claim 71 adds into claim 70 "the maintained shapes is indexed according to umbilic locations and their associated pattern types" which Ohbuchi does not teach. However, Maekawa teaches this feature in page 157, tables 1-2. Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made, in view of the teaching of Maekawa, to configure Ohbuchi's method as claimed because the indexing of the 3-D shapes used for a subsequent comparison helps to improve the speed of process and enhances the detection of the copy of the original surface.

Allowable Subject Matter

4.   Claims 6-25, and 44-63 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: in claims 6, and similar claim 44, and their dependent claims, the step of "performing a weak test comprising comparing corresponding points of the two surfaces to check that the corresponding points are located within a specified distance margin of each other" in combining with the step of comparing the umbilics is allowable; in claims 19, and similar claim 44 and their dependent claims, the step of "performing an intermediate test, comprising: on each surface, computing the principal directions of lines of curvature at each grid point; and comparing the computed directions of lines of curvature for corresponding grid points on the surfaces" in combining with the step of comparing the umbilics is allowable.

5.   Claims 34, 37, 38 are allowed.

The following is an examiner's statement of reasons for allowance: system for determining whether a suspect 3D surface has been copied from

an original 3-D surface, comprising means for determining, for each surface, a wireframe grid based on lines of curvature; means for comparing grid points on the

wireframes of the two surfaces; and means for comparing locations of the umbilics and for comparing pattern types associated with the umbilics.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Double Patenting

6.   Claims 1-71 of this application conflict with claims 1-71 of Application No. 10/040, 960. 37 CFR 1.78(b) provides that when two or more applications filed by the same applicant contain conflicting claims, elimination of such claims from all but one application may be required in the absence of good and sufficient reason for their retention during pendency in more than one application. Applicant is required to either cancel the conflicting claims from all but one application or maintain a clear line of demarcation between the applications. See MPEP § 822.

A rejection based on double patenting of the "same invention" type finds its support in the language of 35 U.S.C. 101 which states that "whoever invents or discovers any new and useful process ... may obtain a patent therefor ..." (Emphasis added). Thus, the term "same invention," in this context, means an invention drawn to identical subject matter. See *Miller v. Eagle Mfg. Co.*, 151 U.S. 186 (1894); *In re Ockert*, 245 F.2d 467, 114 USPQ 330 (CCPA 1957); and *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970).

A statutory type (35 U.S.C. 101) double patenting rejection can be overcome by canceling or amending the conflicting claims so they are no longer coextensive in scope. The filing of a terminal disclaimer <u>cannot</u> overcome a double patenting rejection based upon 35 U.S.C. 101.

Inquires

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Huedung Cao** whose telephone number is **(703) 308-5024.**

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, **Mark Zimmerman,** can be reached at **(703) 305-9798**.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

or faxed to:

(703) 872-9314 (for Technology Center 2600 only)

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is (703) 305-0377.

Huedung Cao
Patent Examiner

MARK ZIMMERMAN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600